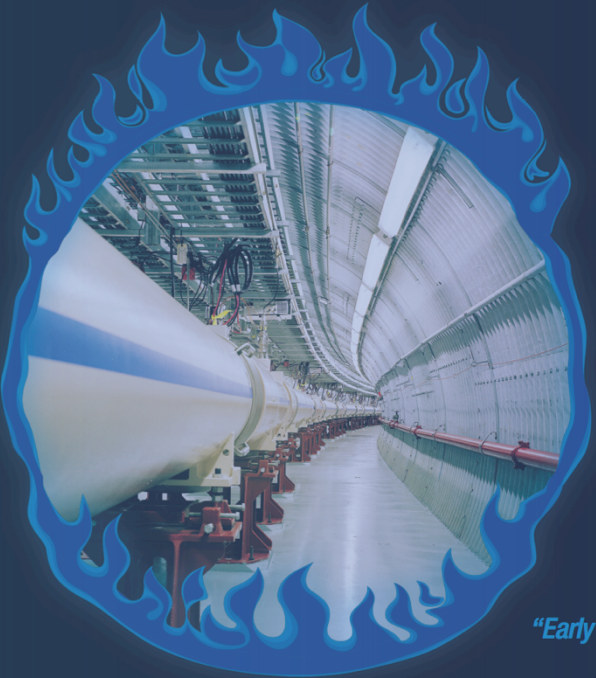


Summary of UEC Activities

Mei Bai for
RHIC/AGS Users' Executive Committee, June 28, 2013



*"RHIC Sets World Record
for Hottest Man-Made
Temperature" – The Verge*

*"Heaviest Antimatter
Found: Made in U.S.
AtomSmasher"
– National Geographic*

*"In Brookhaven Collider,
Scientists Briefly Break
Law of Nature"
– NY Times*

*"Early Universe was 'Liquid-Like'"
– BBC News*

The 2013 RHIC/AGS Annual Users' Meeting
Accelerating Discovery
A Collider for Hot Science

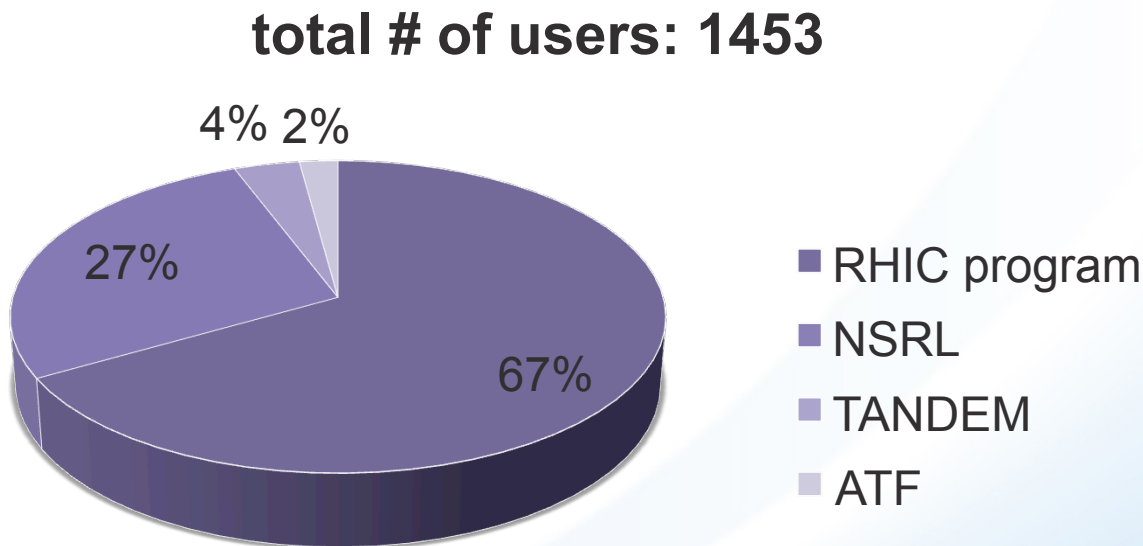
BROOKHAVEN
NATIONAL LABORATORY

a passion for discovery



Who are we?

- A body of volunteers to represent >1000 world-wide scientists, post-docs, as well as students who are conducting their research at RHIC/AGS complex



Who are we?

- Elected members from the pool of RHIC/AGS users, including both on-site staffs as well as people from other universities and institutions
- Appointed members to balance the representations for all facilities, as well as other groups

	Position	Time	Home inst	Program
Mei Bai	Chair	6/12-6/13	BNL	Collider/PHENIX
Paul Sorensen	Chair-elect	6/12-6/13	BNL	RHIC:STAR
Peter Steinberg	Past chair	6/12-6/13	BNL	RHIC:PHENIX
Cesar Luiz da Silva	member	6/11 - 6/14	LosAlamos	RHIC:PHENIX
Pibero Djawotho	member	6/12 - 6/15	Texas A&M	RHIC:STAR
Brant Johnson	member	6/10 - 6/13	BNL	RHIC:PHENIX
Lijuan Ruan	member	6/10 - 6/13	BNL	RHIC:STAR
Anne Sickles	member	6/11 - 6/14	BNL	RHIC:PHENIX
Jim Thomas	member	6/12 - 6/15	LBL	RHIC:STAR
Gang Wang	member	6/10 - 6/13	UC@LA	RHIC:STAR
Zhangbu Xu	member	6/11 - 6/14	BNL	RHIC:STAR
Daniel Cebra	Appt. member	6/12 - 6/14	UC@Davis	RHIC:STAR
James Rosenzweig	Appt. member	6/12 - 6/14	UC@LA	ATF
Murad Sarsour	Appt. member	6/12 - 6/14	Georgia State	RHIC:PHENIX
Kolja Kauder	Stu/Post-doc Rep	6/12 - 6/13	Univ. Illinois	RHIC:STAR
Maya Shimomura	Stu/Post-doc Rep	6/12 - 6/13	Iowa State	RHIC:PHENIX

Who are we?

- Elected/Appointed members from the pool of RHIC/AGS users, including both on-site staffs as well as people from other universities and institutions
- Executive-officio members from BNL senior management
 - [Doon Gibbs](#), Director of BNL
 - [Tom Ludlam](#), Chair of Physics Dept. of BNL
 - [Berndt Mueller](#), ALD of Nuclear Particle Physics Directorate
 - [Phil Pile](#), Head of Experiment & Support Div. of C-A Dept.
 - [Thomas Roser](#), Chair of C-A Dept
- Administrative experts from BNL Guest/Visitor center
 - Kathleen Nasta, manager of GUV center
 - Kelly Guiffreda, administrator of RHIC/AGS User center
 - Angela Melocoton, supervisor of GUV center

Functions of RHIC/AGS UEC

- Work with BNL Guest/Visitor center to help the researchers from all over the world who come to BNL to use the RHIC accelerator facilities, collider, the AGS, Tandem Van de Graaff, NASA Radiation Lab(NSRL), and the Accelerator Test Facility(ATF)
- Provide an organized channel for the communication between BNL management and users
 - To inform the BNL management the needs and desires of those who actively engaged in the leading research projects
 - Inform user community with BNL management's current and future plans for the laboratory
 - Work with BNL management to promote the quality of life of users
- Outreach to advocate for science at RHIC/AGS facilities

Working Groups of RHIC/AGS UEC

- Site Access & Science (SAS)
 - Work with BNL Guest/Visitor center to help the users to have smooth access to the campus
- Funding, Politics & Programmatics (FPP)
- Meetings, Communication & Outreach (MCO)
- Quality of Life

Significant events in the past year

- NSAC's charge to provide advice on implementing priorities and recommendations of the 2007 NSAC Long Range Plan in the light of projected budgetary constraints and for guidance on developing a plan to implement the highest priority science in the context of likely funding and world-wide capabilities

Letter from NSAC chair Dr. Geesman to Prof. Tribble Of Texas A&M, the chair of sub-committee

Dear Bob,

As you know William Brinkman, Director of the Office of Science at DOE, and Edward Seidel, Associate Director for the Directorate of Mathematical and Physical Sciences at the NSF, have charged NSAC to provide advice on implementing the priorities and recommendations of the 2007 NSAC Long Range Plan in light of projected budgetary constraints and for guidance on developing a plan to implement the highest priority science in the context of likely available funding and world-wide capabilities.

The charge, of which you have a copy, asks that the report should describe how to optimize the overall nuclear science program over the next five years (FY2014-2018) under at least two budget scenarios: (1) flat funding at the FY2013 request level and (2) modest increases over the next five years.

Action from UEC

- Launched a pledge in the fall of 2012 within RHIC community to encourage people to provide their point view on the essential aspects of RHIC science from their expertise through the communication channel provided by the sub-committee through website.

NSAC Subcommittee 2012

[Index](#)
[GEN](#)
[LEP](#)
[RHI](#)
[MEP](#)
[FSN](#)
[THE](#)
[FAC](#)

Login

Search

NSAC Subcommittee 2012 Comments

Topics for RFC's	
GEN	General Comments
LEP	Low Energy Physics Comments (nuclear structure, nuclear reactions, nuclear astrophysics)
RHI	Relativistic Heavy Ion Physics Comments
MEP	Medium Energy Physics Comments
FSN	Fundamental Symmetries and Neutrinos Comments
THE	Theory Comments
FAC	Facilities Comments

Action from UEC

- Launched a pledge in the fall of 2012 within RHIC community to encourage people to provide their point view on the essential aspects of RHIC science from their expertise through the communication channel provided by the sub-committee through website
- 2012 DC Town meeting on Heavy Ions:
 - Part of RHIC/AGS UEC Open Forum meeting
 - Organized and led by Paul Sorensen
 - **More than 250 people attended**
 - Focused on the significance of sub-committee charge as well as RHIC physics case



Action from UEC

- Launched a pledge in the fall of 2012 within RHIC community to encourage people to provide their point view on the essential aspects of RHIC science from their expertise through the communication channel provided by the sub-committee through website
- 2012 DC Town meeting on Heavy Ions:
- **Petition letter to NSAC sub-committee**
 - Initiated and led by Peter Steinberg, also strongly supported by BNL management: Marge Lynch(ALD of community education, government and public affairs) and Doon Gibbs(Lab director)
 - To emphasis the excellence and importance of current RHIC program as well as its future
 - A total of **744** signatures were collected! And letter was delivered to the sub-committee before their Jan. meeting

September 5, 2012

CONTACT UEC

Dear NSAC Subcommittee:

We are writing you to express our commitment to the ongoing science program at the Relativistic Heavy Ion Collider (RHIC), and to request full support for its running in the next decade.

Since the first collisions of gold beams in 2000, and polarized proton beams in 2001, RHIC has experienced an era of unparalleled scientific productivity, with major advances for nuclear physics from nearly every experimental run, and many major discoveries about the properties of hot, dense nuclear matter. This began with the earliest observations of jet quenching and collective flow, which led to a breakthrough when it was realized that the quark-gluon plasma formed at RHIC is best described as a near-perfect liquid. It has been shown to be one of the most perfect liquids found in nature, and its temperature was recently measured to reach an astounding seven trillion degrees Fahrenheit, with conditions similar to those of the early universe, just microseconds after the Big Bang.

The results at RHIC have found widespread acclaim in the scientific community as well as with the general public, and sparked surprising connections with seemingly unrelated fields such as ultra-cold atomic physics and string theory. RHIC data have also provided the essential context for new results from the collisions of lead beams at the Large Hadron Collider (LHC).

The RHIC scientific community is a large, international group of experimental and theoretical physicists, and we feel strongly that the future of the study of hot, dense quark-gluon matter worldwide relies on continuing US leadership. While the recent LHC data have provided important new insights to the field, it is clear that only RHIC can produce the widest range of initial conditions necessary to characterize how the nearly perfect liquid is created and how it behaves. These questions are of clear relevance to understanding the strong interaction at a deep level as well as for providing insight into how the very early universe may have evolved. RHIC is also the world's only polarized proton collider, an essential tool for investigating the origin of proton spin, an ongoing mystery in physics.

These programs exploring various aspects of nuclear physics at RHIC serve as a major resource for training the next generation of nuclear and accelerator physicists. Since 2000, about 350 graduate students have performed their PhD research at RHIC. These students have gone on to contribute to our society and economy in a variety of useful roles, both in science and other fields. Society also benefits significantly from the use of beams from the RHIC complex for a wide range of scientific and medical applications: the development of cancer treatments, radioisotopes, radiation detectors for national security, and assessing the feasibility of long-term space travel.

The next five years will see the full exploitation of RHIC's capabilities: the wide range of beam energies, the wide variety of colliding systems using the new EBIS ion source, and the high luminosities provided by stochastic cooling for ions and electron lenses for polarized protons. The recent (and imminent) upgrades to both the PHENIX and STAR detectors will allow us to take full advantage of these new capabilities. For the years beyond 2018, the RHIC collaborations are planning major upgrades to their systems. These will both dramatically enhance their performance for jets and quarkonia, which are important tools for characterizing the underlying physics of the quark-gluon plasma, and for a wide array of measurements in the forward direction, which will give unique insight into the deep structure of the nuclear wave-function.

We are convinced that continuing the RHIC program is essential to produce world-leading science from the US nuclear physics program -- using the only remaining collider in the United States -- and it is critical to our own research, and that of our students, in the next decade.

For these reasons, we urge your support for RHIC, as its most productive years are still to come.

Respectfully,

The RHIC complex scientific community

Please note: This letter was signed by 740 plus individual's supporting the RHIC scientific community

Outreach for RHIC science

■ Nuclear Physics DC Day

- Joint capitol hill visit among all three major NP facility labs (BNL, Jlab and FRIB) on May 6, 2013
- Organized by the lobbyists from all three labs
 - Paul Doucette, Shawn Smeallie, Sarah Walter, Greg Kubiak, ...

Preparation for Capitol Hill Visit

- From the training by Paul Doucette and Shawn Smeallie

Battelle
The Business of Innovation

Knowing Your Audience Defining the Cultural Divide

<u>Scientists</u>	<u>Politicians/Polymakers</u>
Numbers	Words
Objective/Facts	Subjective/Public Opinion
Hate to make promises	Love to make promises
Quantitative	Qualitative
Technical	Political
Problem seekers	Issue seekers
Ask why	Ask why they should care
Money = research	Money = getting re-elected (& deficits)
Think long term	Think short term
Publicity avoiders	Publicity hounds
Science page	Front page
Specialists	Generalists

Brookhaven S

Tobin Smith, Association of American Universities, Working with Congress and a New Administration, February 2009

BUSINESS SENSITIVE

HAVEN
BORATORY

8

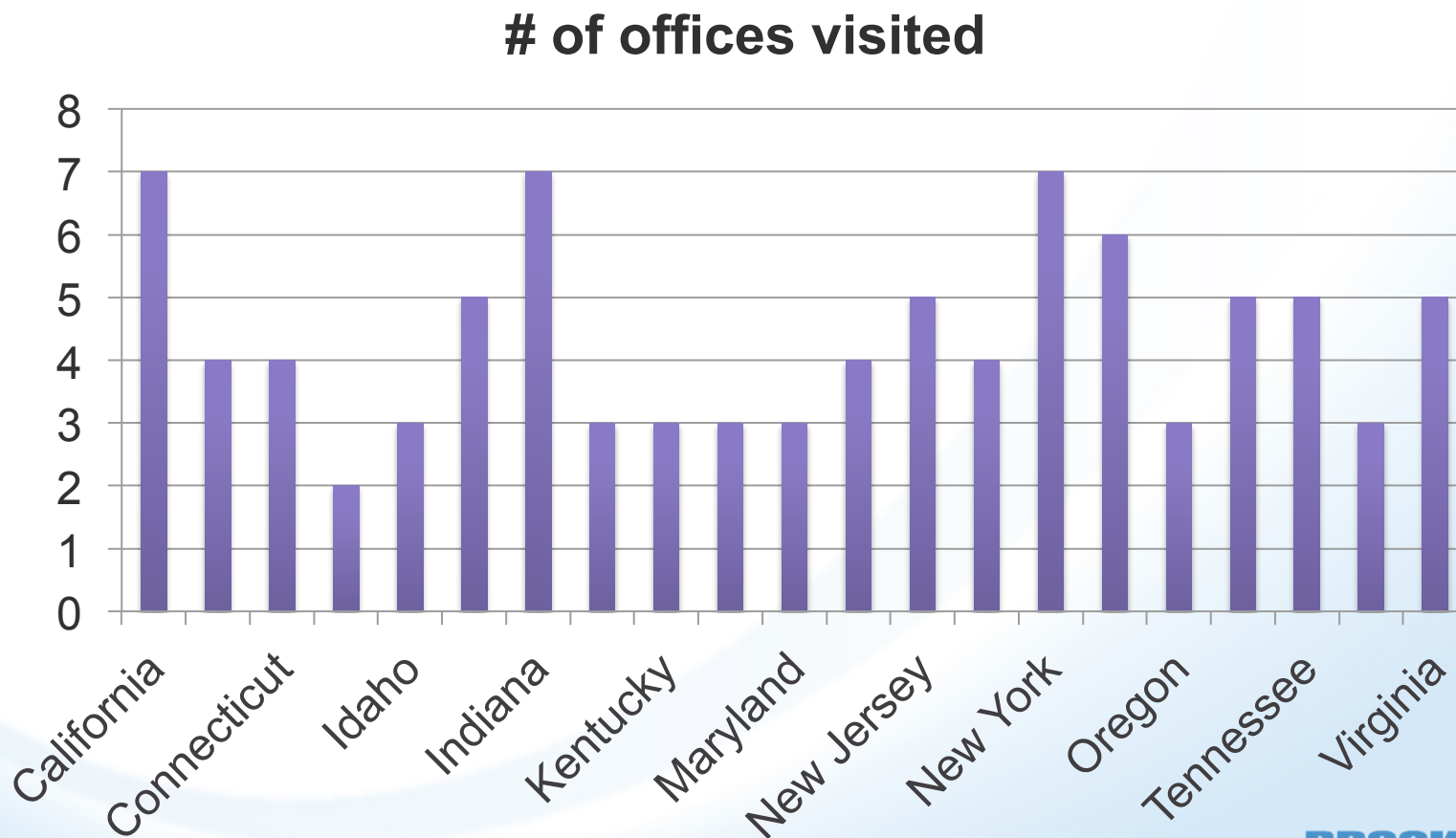
Outreach for RHIC science

■ Nuclear Physics DC Day

- Joint capitol hill visit among all three major NP facility labs (BNL, Jlab and FRIB) on May 6, 2013
- Organized by the lobbyists from all three labs
 - Paul Doucette, Shawn Smeallie, Sarah Walter
Greg Kubiak, ...
- Goal is to advocate for Nuclear Physics to make sure our nation's policy makers aware of the importance of nuclear physics research to the national interest as well as economic growth
- A total of **34** users from RHIC community joined the effort and visited **91** offices ranging over **21** states

Nuclear Physics DC Day

- A total of 34 users from RHIC community joined the effort and visited 91 offices ranging over 21 states



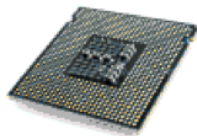
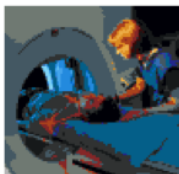


Nuclear Physics DC Day

Washington, DC • May 5-6, 2013

Top 10 Things You Didn't Know You Loved About Nuclear Physics

- 1. Radiocarbon Dating** - This technique that revolutionized modern archeology was developed from basic research on cosmic rays in the 1940s. It makes use of the fact that the rare isotope ^{14}C is continually created in earth's atmosphere by cosmic rays.
- 2. Smoke Detectors** - This technology was first conceived in 1890 "by accident" during an experiment on the light-refracting properties of ionized gases. Modern versions rely on a technology developed in the 1960s using a rare isotope of americium, ^{241}Am .
- 3. Well Logging for Oil and Gas Exploration** - First applied in the early 1960s, modern radiation sensors and neutron generators are commonly used to measure the potential of new oil field finds before major drilling commences.
- 4. Advanced Medical CT Scanners** - The first tomographic imaging concept was developed by an Italian radiologist exploring early uses of photographic film to study radioactive decay. The step to modern CT scans needed the application of X-ray detector technology from nuclear science and more and more powerful computational capability. The new big thing is next generation methods that use advanced particle accelerators of protons to make even more sensitive scans.
- 5. Medical Diagnostic Procedures** - In 1936 the first cancer patient was treated by radioisotopes produced by E.O. Lawrence, winner of the Nobel Prize for the invention of the cyclotron. Now, each year more than 16 million Americans benefit from diagnostic procedure based on the use of radioisotopes. Progress continues with new applications found yearly including better ways to diagnose and understand Alzheimer's disease.
- 6. Food Irradiation** - First widely employed during World War II to help preserve rations for U.S. troops, use of gamma rays from radioactive cobalt for food irradiation now helps eliminate pathogens and extend the shelf-life of more than 500,000 tons of food each year.
- 7. Radiation Detectors at Ports** - The first radiation detector was invented in 1908 by scientists searching for the nature of the atomic nucleus. With modern accelerator technology and advanced radiation detectors developed for basic research we have a means to monitor material coming into the U.S.
- 8. MRI Imaging** - The concept of nuclear magnetic resonance was discovered in the 1930s by researchers studying the physics of spinning nuclei by placing them in strong magnetic fields and irradiating them with radio waves.
- 9. Modern Manufacturing** - Particle beam technology developed for nuclear science in the 50s and 60s is now used to treat or inspect a wide range of products worth over \$500 billion per year. New accelerator technology inspired by nuclear science is leading to the next generation of these methods.
- 10. The Next Big Thing** - Right now a nuclear physics researcher, possibly even one of the FRIB, JLAB, or RHIC users, is working on research that will lead to the next innovation that will change the world! The question is not if, but when and where.



Nuclear Physics DC Day
Washington, DC • May 5-6, 2013

FACTS

Nuclear Science at RHIC

BROOKHAVEN
NATIONAL LABORATORY

Purpose

To study the fundamental properties of matter from elementary atomic particles to the evolution of the universe

Sponsor

U.S. Department of Energy's Office of Nuclear Physics

Replacement Cost

~\$2 billion

Features

- Two crisscrossing rings in a tunnel 2.4 miles in circumference
- 1,740 superconducting magnets
- Two complementary, state-of-the-art detectors: PHENIX and STAR
- Collides everything from polarized protons to heavy nuclei across an unmatched range of beam energies

Users

Over 1,000 per year from national and international laboratories, universities, and other research institutions

NSAC Support

The nation's Nuclear Science Advisory Committee expresses strong support for RHIC:

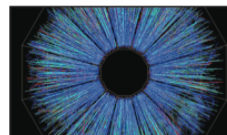
A modest-growth budget "will allow the U.S. to preserve the tools that enable our science" and "represents the minimal budget for a viable U.S. program that maintains leadership in the core areas of nuclear science."

— 2012 NSAC Subcommittee Report to DOE Office of Science and NSF

The committee ranks "RHIC as Absolutely Central in its ability to contribute to world-leading science in the next decade."

— 2013 NSAC Subcommittee Report on Scientific Facilities

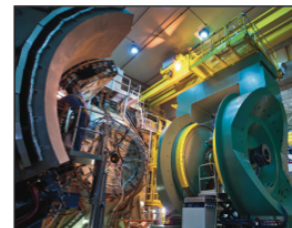
www.bnl.gov/rhic



Thousands of particle tracks at STAR

Exploring Matter at the Dawn of Time *The Relativistic Heavy Ion Collider: Inspiring Science and Innovation*

Scientists' quest to understand the early universe and interactions among its fundamental particles has inspired the design, construction, and continuous improvement of the Relativistic Heavy Ion Collider (RHIC), the world's most versatile particle collider.



PHENIX, one of RHIC's particle-tracking detectors

The research conducted at this complex machine attracts the world's best and brightest minds, inspires a new generation of scientists, and drives technological advances in many fields. RHIC is a vital national resource for cutting-edge discovery, accelerator science and engineering R&D, future workforce development, and continued U.S. leadership in science and technology.

RHIC is at Peak Productivity

- Record-setting collision rates and proton polarization in 2012
- Collisions between new types of ions that provide new dimensions of control in the study of early-universe matter
- Vast and significant contributions to science in just 12 years: 350+ scientific papers receiving 35,000+ citations; at least 350 Ph.D.s with hundreds more in the pipeline; 190 tenured or tenure-track faculty and research positions

The Only Collider in the U.S.

- RHIC is the only U.S. collider, and the world's only polarized proton collider.
- RHIC collides particles over a wide range of energies to explore details of the transition between matter at the dawn of time to the atomic nuclei that make up 99 percent of visible matter in the universe today.
- Physicists from RHIC and Europe's Large Hadron Collider (LHC) agree that *both* RHIC and LHC are needed

to fully study early-universe matter.

Strategic Impact

- RHIC supports 1,469 full-time equivalent jobs.
- RHIC and its users generate more than \$180 million in annual economic output.
- Spin-off benefits include: medical

isotopes for heart scans and cancer treatment; studies of space radiation to protect future astronauts; accelerator advances that could improve cancer treatment and nuclear reactor safety; R&D to advance energy storage; and computational approaches for managing "big data" in many fields.

- RHIC attracts hundreds of students each year and inspires careers in science, technology, engineering, and mathematics (STEM) fields.
- Research at RHIC helps train the high-tech workforce the U.S. needs to address broad-impact scientific and technical challenges, including communications, energy technologies, national security, medicine, and more.

Budget Cuts Threaten RHIC

- Curtailing RHIC research would decimate U.S. leadership in nuclear physics.
- Scientific talent and programs—and spin-off benefits—would move to Europe, Japan, and China, perhaps permanently.
- Foreign investments would be lost and international collaborations jeopardized.
- Closing RHIC would endanger an affordable path to the next generation research facility for nuclear science, an Electron-Ion Collider.
- Sufficient funding for RHIC would build on a \$2-billion taxpayer investment and cost-effective upgrades, enabling compelling research and ancillary benefits well into the next decade(s).

Quality of life at BNL

- **Continue to be the watchdog for the onsite QOL issues**
 - The latest announcement of closing the weekend/evening food service at BNL center (Monday Memo on March 11, 2012) has a negative impact on BNL guests/users

[Monday Memo Home](#) | [Archives](#)

Monday, March 11, 2013

Important Changes to BNL Food Services

By Lanny Bates

Brookhaven Science Associates' (BSA) contract with Nanyarsons to provide food services at the Laboratory was scheduled to end today, March 11.

Weekend cafeteria service – Demand for food service on Saturdays and Sundays is insufficient to cover minimum labor costs. The cafeteria will therefore close on weekends effective the end of the month.

BROOKHAVEN
NATIONAL LABORATORY

Monday Memo

The long-term need for the Brookhaven Center Club's food and beverage service is being evaluated. During the six-month extension, the Center Club will continue to operate. It originally opened as an evening food service option for people living in on-site housing. While we remain sensitive to the needs of our guests and users, the reality is that demand from on-site residents is insufficient to cover the labor cost on most nights.

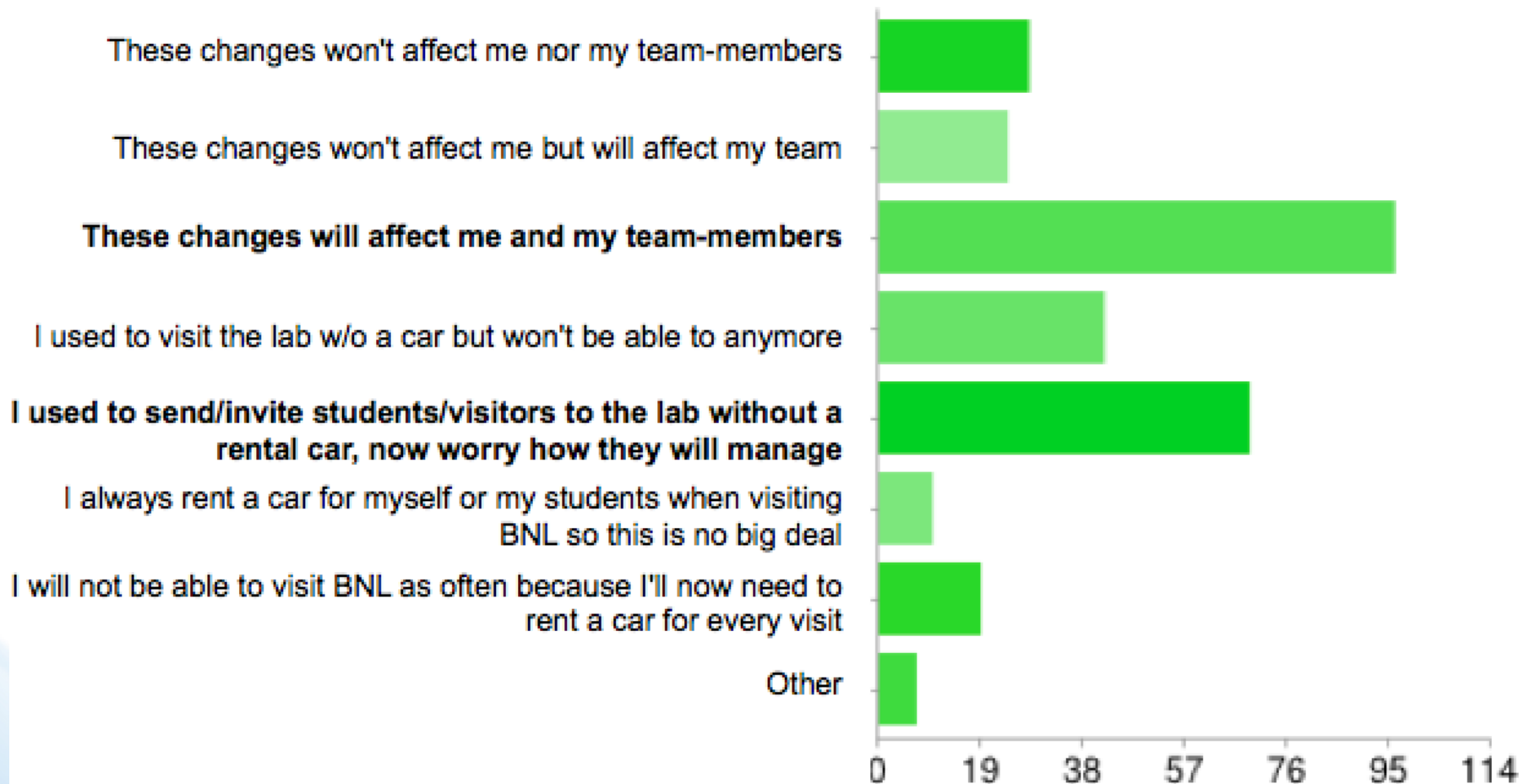
Quality of life at BNL

- Continue to be the watchdog for the onsite QOL issues.
 - The latest announcement (Monday Memo on March 11, 2012) of closing the weekend/evening food service at BNL center has an negative impact on BNL guests/users
 - **Quick response from UEC by a survey put together by Paul Sorensen, and within 24 hours, a total of 205 responses were received!**

Quality of life at BNL: Results of Users Poll

(from Paul Sorensen)

Let us know how you will be affected by these changes:



Quality of life at BNL

- **Continue to be the watchdog for the onsite QOL issues**
 - The latest announcement of closing the weekend/evening food service at BNL center (Monday Memo on March 11, 2012) has an negative impact on BNL guests/users
 - **Quick response from UEC by a survey put together by Paul Sorensen, and within 24 hours, ~200 responses were received!**
 - These results were delivered to the lab management together with the user groups in NSLS as well as CFN. They were impressed with our survey results and responded quickly with open meeting lab-wide.

Outreach for RHIC science

- Work with Karen McNulty Walsh from BNL public affairs to collect RHIC alumni stories <http://www.bnl.gov/rhic/education.asp>
 - Currently featured with Cloudant trio of Hoffman, Kocoloski, Miller, who were part of STAR, and Johan Conzalez who now design algorithms for analyzing data from radar sensors here on Earth—the kind the military use to keep us safe from more threatening "smashups."

RHIC Physics Feeds Future High-Tech Workforce

The RHIC program constitutes a technical, scientific wellspring that feeds many fields. Maintaining such facilities keeps an ever-more-sophisticated, highly specialized workforce growing.

- Please contact Karen at kmcnulty@bnl.gov to share your story!!!

Share Your RHIC/Post-RHIC Story!

We'd love to feature more stories of RHIC alums. If you did all or part of your Ph.D. research at RHIC please contact [Karen McNulty Walsh](mailto:kmcnulty@bnl.gov), (631) 344-8350.

Conclusions

conclusions from Peter Steinberg's last year UEC summary:

- The RHIC/AGS Users Group is your voice
 - With BNL management, to improve access to BNL and quality of life
 - And to work with your colleagues to promote RHIC science The RHIC/AGS UEC is a means to help you do this
- Please get involved by running for UEC elections as a member or for chair !
- Please get involved by coming to open meetings! Please get involved by writing for Inside RHIC! And we are always open to new ideas!

RHIC/AGS Users Group is absolutely essential for the success of RHIC program, present and many years to come!

Acknowledgement

- BNL Management
 - For their strong support for RHIC/AGS Users group
- Marge Lynch on her help in making the arrangement for the capitol hill visit
- Karen McNulty Walsh for her help on putting together “RHIC Fact” sheet as well as other documents for the capital hill visit
- Users who volunteered their time to help us to advocate for science at RHIC
 - Reach out to NSAC sub-committee
 - join the capitol hill visit
 - Visit their local representatives

Acknowledgement

Many Thanks from the band of Peter, Paul and Mei(Mary) ☺

